

We claim:

1 1. An improvement in a method of microfabricating elastomeric material
2 having a characterizing surface tension comprising decreasing the surface tension of
3 the elastomeric material and photolithographically processing the elastomeric material
4 with decreased surface tension.

1 2. The improvement of claim 1 where decreasing the surface tension of the
2 elastomeric material comprising forming a silicon dioxide layer on the elastomeric
3 material.

1 3. The improvement of claim 2 where forming a silicon dioxide layer on the
2 elastomeric material comprises sputter depositing silicon dioxide on the elastomeric
3 material.

1 4. The improvement of claim 2 where sputter depositing silicon dioxide on the
2 elastomeric material comprises sputter depositing silicon dioxide in an argon-oxygen
3 plasma.

1 5. The improvement of claim 1 where decreasing the surface tension of the
2 elastomeric material comprising forming a silicon nitride layer on the elastomeric
3 material.

1 6. The improvement of claim 5 where forming a silicon nitride layer on the
2 elastomeric material comprises sputter depositing silicon nitride on the elastomeric
3 material.

1 7. The improvement of claim 6 where sputter depositing silicon nitride on the
2 elastomeric material comprises sputter depositing silicon nitride in an argon-nitrogen
3 plasma.

1 8. The improvement of claim 1 where decreasing the surface tension of the
2 elastomeric material comprising forming a silicon layer on the elastomeric material.

1 9. The improvement of claim 8 where forming a silicon layer on the
2 elastomeric material comprises sputter depositing silicon on the elastomeric material.

1 10. The improvement of claim 9 where sputter depositing silicon on the
2 elastomeric material comprises sputter depositing silicon in an argon plasma.

1 11. The improvement of claim 2 further comprising forming a silicon nitride
2 layer on the silicon dioxide layer.

1 12. The improvement of claim 11 where forming a silicon nitride layer
2 comprises sputter depositing silicon nitride on the silicon dioxide layer.

1 13. The improvement of claim 12 where sputter depositing silicon nitride on the
2 comprises sputter depositing silicon nitride in an argon-nitrogen plasma.

1 14. The method of claim 1 where decreasing the surface tension of the
2 elastomeric material decreases the surface tension of polydimethylsilicone.

1 15. The method of claim 1 where decreasing the surface tension of the
2 elastomeric material decreases the surface tension of a room temperature vulcanizable
3 (RTV) silicone elastomer.

1 16. A method of directionally etching an elastomeric material comprising
2 providing an RF plasma etching system, creating an oxygen plasma in the presence of
3 Freon in the RF plasma etching system, removing silicon tetrafluoride from the RF
4 plasma etching system.

1 17. The method of claim 16 where removing silicon tetrafluoride from the RF
2 plasma etching system comprises pumping the silicon tetrafluoride out of the RF plasma
3 etching system.

1 18. The method of claim 16 where creating an oxygen plasma in the presence
2 of Freon comprises creating the oxygen plasma in an approximately 90% oxygen and
3 10% Freon mixture.

4 19. The method of claim 16 where removing silicon tetrafluoride from the RF
5 plasma etching system comprises maintaining the oxygen plasma under a partial
6 vacuum of approximately 400 mTorr.

7 20. A method of directionally etching an elastomeric material comprising the
8 steps of providing an RF plasma etching system, creating an oxygen plasma in the
9 presence of Freon in the RF plasma etching system, and removing silicon tetrafluoride
10 from the RF plasma etching system.